

Watershed Management Plan for KAROON River in Iran Based on IWM Method (Case Study)

Hamid Reza Solaymani Osbooei¹ – Mahnaz Bafandeh Haghighi²

¹Watershed Management Deputy, P.O. Box 11445-1136, Tehran-Iran, Tel: +98 21 22462234;
Fax: +98 21 22442226; Web site: <http://www.frw.org.ir>; E-mail: hrosolaymani@yahoo.com

²KAM Consulting Engineers Company, Tehran –Iran, Tel: 0098 21 66935073; Fax: 0098 21 66904644;
E-mail: mahnaz.haghighi@gmail.com

1. Abstract

Watershed plays an important role as a source of water, biodiversity, tourist areas and place of living for local inhabitants. Since the ancient times, many important civilizations have risen in the regions, which could not come into existence in the first place without living in harmony with nature as well as practicing efficient use of limited resources in the area.

In many regions in Iran, runoff and flooding are produced in some cases from rainfalls as little as 9 mm over a small catchments, causing considerable loss of life and properties. Drought and flood has become two familiar terms in the Iranian climatic conditions. In last half a decade, more than 3700 flood events have been reported, which 53% of them occurred during the last 10 years. The number and peaks (not volume) of flood events and their damages in the last 20 years have increased. Flooding and water shortages are two different sides of the same coin. Now, Integrated Watershed Management(IWM) is one the best to control of this kind disaster

2. Introduction

The KAROON River is a tributary of Tigris-Euphrates and has the largest drainage area (about 70000 km²) in the Iran. The upstream basin occupies the highly elevated Zagros mountain range where natural disasters such as debris flow, landslides and floods are prevailing because of the land degradation and subsequent soil erosion.

In order to avoid and /or reduce the damage of the above mentioned natural disasters, the Government of Iran has made continues efforts afforestation in the mountain area and constructing small scale check dams to prevent soil erosion and keep upstream river channel stable. The objectives of study area are:

- To formulate a master plan on integrated watershed management of the selected area in Karun watershed (in KHUZESTAN province) to prevent further degradation of natural resources and promote sustainable development.
- To participate rural peoples and stakeholder for prevent land degradation and watershed management activities.

The overall goal of the master plan is to break through the above vicious cycle at two nodes of the "Degradation of natural environment" and "Decrease o farm income". In order to realize the overall goal, following five projects purpose are proposed:

1. Mitigation of flood, debris flow and landslide damages
2. Control of soil erosion and conservation of water
3. Restoration and improvement of range vegetation
4. Improvement of living standard
5. Improvement of agriculture product/input marketing agriculture extension and strengthening of community activities

3. Methods

The whole study area covers the upper KAROON watershed of 26,800 km² area that is shown in the Location Map. The phase 2 study in a master plan on the five areas selected in phase 1 Inventory Study. The five selected areas are as follows:

1. K4-1-9 VASTEGAN
2. K5-19_a CHAMAN GOLI – BAZOFT
3. K7-0-19-1 SARBAZ
4. K7-48 TANGSORKH
5. K8-28 ZERAS

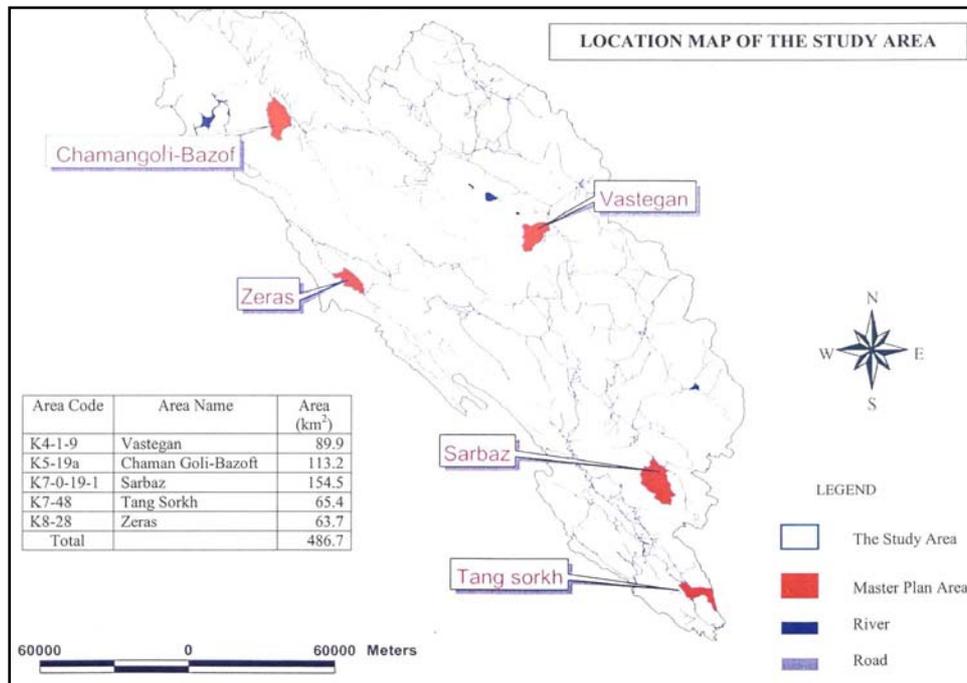
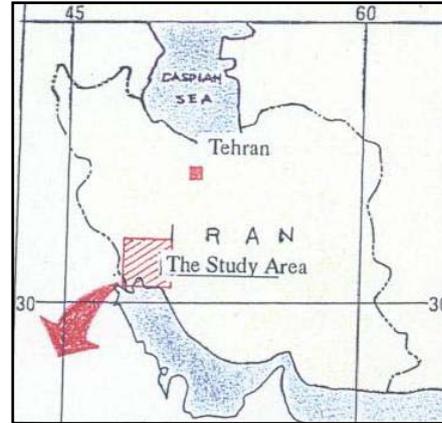


Figure 1 Location Map of the Study Area

The above selected areas recognized and studied based multi-criteria factors. These criteria are as follows:

- Physical features that consists of different factors
 - i. Location and Topography
 - ii. Geology
 - iii. Meteorology
 - iv. Hydrology and Rivers Regimes
 - v. Soil
- Land Use and Vegetation
 - i. Current Land Use
 - ii. Land Capability
 - iii. Vegetation
 - iv. Right of Common

- v. Nomads Situation
 - vi. Present Grazing Situation
- Socio – Economic Conditions
 - i. Administrative Divisions
 - ii. Population
 - iii. Land Tenure and Land Holding
 - iv. Income Level
- Rural Infrastructure
 - i. Road Network
 - ii. Water Resources
 - iii. Water Supply
 - iv. Irrigation
- Agriculture and Other Rural Industry
 - i. Agriculture
 - ii. Livestock
 - iii. Inland Fishery
 - iv. Rural Industry
 - v. Marketing System
- Natural Disaster related to Watershed Management
 - i. Flood and Debris Flow
 - ii. Landslide
 - iii. Surface Soil Erosion
- Social Status in Rural Area
 - i. Rural Community
 - ii. Public Organization
 - iii. Farmer Organization
 - iv. Public Services
 - v. Education
 - vi. Human Development Index(HDI)
 - vii. Gender Issue
 - viii. Religion
- Environment

There are three protected areas, one national nature monument and four wetlands of environmentally important as the national environment reserve.

The Study Team facilitated five project Cycle Management (PCM) workshops applying the PCM method including its participatory approach for planning. The workshops were held for the purpose of preparing a framework of the master plan of each pilot sub-basin and all the stockholders. Furthermore, the technology transfer on the participatory planning from the JICA (Japan International Corporation Agency) Study Team to the Iranian counterpart personnel was also intended.

3. Overall Goals and Project Purpose

The area has been degraded by decrease of the vegetation and the forest area due to overgrazing and cutting trees for fuels and reclamation for increase of the new cultivation area. In case of heavy rainfall or rapid snow melting, many types of disasters such as debris flow and flood are anticipated. The area is suffering from a vicious cycle of natural-social environment: “Decrease of farm income (Poverty) – Further exploitation of land – Degradation of natural environment – Natural disaster and damage of farm land – Decreases of productivity of land – Decreases of farm income (Poverty)”. The vicious cycle is shown below, and the regional society is facing of collapse. The overall goal of the master plan is to break through the above vicious cycle at two nodes of “Degradation of natural environment “and “Decrease of farm income”. In order to realize the overall goal, following five project purposes are proposed.

- Mitigation of flood, debris flow and land slide damages
- Control of soil erosion and conservation of water
- Restoration and improvement of rangeland vegetation
- Improvement of living standard
- Improvement of agriculture product/input marketing, agriculture extension and strengthening of community activities

In order to reinforce and/or supplement the resistance to natural disaster, civil structures in various types and vegetation measures are planned appropriately. With these measures, restoration and/or improvement

on the devastated terrain will be accomplished and maintained properly, and eventually flood/ debris flow and soil erosion is to be lessened and/or mitigated.

As direct objectives, protection of villages, farmland and infrastructure such as roads and irrigation facilities is planned as disaster prevention measures. In the plan formulation, the required number of facilities is examined based on the characteristic of each plan area, and the urgency, which is dependent on the correlation between direct objectives for protection and degree of devastation.

Non-structural measures, such as warning and evacuating system during disaster, and training for operation and maintenance on the disaster prevention are to be examined. These development plans include "Structure Measure Plans" and "Non-structure Measure plans". These two plans can not be divided each other. They should make up for each other for accomplishment of themselves. Structure Measure Plans include procurement of equipment and materials, establishment of facilities, etc. On the other hand, Non-structure Measure Plans include establishment of groups and cooperatives, training and education by government to said groups and cooperatives. Civil works such as construction of checkdams rehabilitation of rural road and rural water supply will be implemented by public works in principle. In this case it is very important that people's participation is not for saving investment by using free labor force from people's groups, but for strengthening the people for sustainable development. Implementation of the proposed projects had been commenced in 2002, after completion of the master plane study, and will be completed in 2020.

Under the leadership of watershed management deputy, Forest Range and Watershed Management Organization, Project Coordination Committee for the implementation of the projects should be established. Relevant government organizations both in the local and central level should be organized into the committee. The text of committee are a) to coordinate rules and tasks among relevant government organization, b) to adjust and allocate budget for the project implementation, c) to manage project implementation organization, d) to provide necessary information and administrative assistance to project implementation organization.

For smooth implementation of the projects, Project Implementation Committee had established. The main implementation body is to be provincial watershed management organization. The Organization is to entrust the consultant with the detailed design of main facilities, to give the contractor an order of construction works by means of tendering, and to supervise and support village organization for the operation and maintenance of the project facilities. The duties of the project implementation committee are:

- To facilitate the village organization to promote villager's participation into the project implementation
- To established rules and regulation for the management, operation and maintenance
- To provide training course to representative of village organization
- To implement the projects in cooperation with village peoples

The structural measures taken in the projects are comprised of various works and facilities such as flood and debris flow control facilities, irrigation facilities, roads and terracing, etc. These are classified into two types of works from managerial aspect, operation management type and function management type.

The village organization should carry out the maintenance works in principle. The project implementation committee is to prepare the rules and regulation for management and maintenance of the project facilities so that village organization maintains the expected operational function and development.

5. References

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